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It may be found eventually, say the men who worked out the principle, that the animal organism, also, is capable of responding to the stimulus of certain day lengths. They believe that the migration of birds may be an illustration. Direct response to such a stimulus, they say, is more in line with modern teachings of biology than theories which assume that birds migrate as a matter of instinct.

PIN OAK IN NEBRASKA

BY RAYMOND J. POOL

In a handbook of Nebraska trees published in March, 1919, I made the statement that: "Pin oak does not occur naturally in Nebraska, but it occurs in north central Missouri and eastern Kansas, so we may expect it to wander into our state some day via the southeastern corner." The statement is rather interesting in view of the fact that pin oak was discovered in southeastern Nebraska during the summer of 1919.

Early in September, 1919, Mr. Thomas D. Howe, collector for the department of botany in the University of Nebraska, collected specimens from an oak tree growing near Table Rock, Nebraska, and he believed that the tree was pin oak, *Quercus palustris* Du Roi. Mr. Howe brought his specimens to the department of botany where his earlier judgment was confirmed by further study and comparison by several members of the department.

The tree in question is about 20 feet in height with a trunk diameter of about 5 inches, breast high. It is growing in association with red oak at the edge of the natural oak woodlands on the north-facing slope of a low hill about 1½ miles northeast of Table Rock. That town is in Pawnee county, about 35 miles from the extreme southeastern corner of the state, but only about 15 miles from the Kansas-Nebraska state line.

The nearest house is a quarter of a mile from where the tree stands on the edge of the forest where the forest gives way to a cultivated field. It would seem very unlikely that anyone could have planted the acorn in such a place; there would be no

object whatever in starting a pin oak in that particular spot. There are no planted pin oaks in the vicinity. All of our evidence clearly indicates that the tree discovered by Mr. Howe is native. As such this tree is doubtless the most westerly individual of the pin oak yet discovered growing under natural conditions, and to all appearance native. This adds another species to the list of native trees of Nebraska, a list which now contains about sixty-five species.

The specimens which Mr. Howe collected are now deposited in the herbarium of the Botanical Survey of Nebraska.

It may be of interest to the readers of this journal, in connection with the above note, to have a list of all of the native oaks of Nebraska. The list follows:

- Bur oak, *Quercus macrocarpa* Michx.
- Red oak, *Quercus rubra* L.
- Black oak, *Quercus velutina* Lam.
- Scarlet oak, *Quercus coccinea* Moench.
- Black jack oak, *Quercus marilandica* Moench.
- White oak, *Quercus alba* L.
- Swamp white oak, *Quercus bicolor* Willd.
- Yellow oak, *Quercus acuminata* (Michx.) Sarg.
- Low yellow oak, *Quercus prinoides* Willd.
- Laurel oak, *Quercus imbricaria* Michx.
- Pin oak, *Quercus palustris* Du Roi

The bur oak is by far the most abundant and most widely spread species of the genus in this state. The species is found very commonly in the drier sites in the gallery woods along the streams quite generally over the eastern half of the state. The commonest oak associate of the bur oak is the red oak, although the latter is not nearly so widely distributed or as abundant as the bur oak. On the dry exposed bluffs the bur oak is often dwarfed to such a degree as to form a chaparral-like association, often called "scrub oak."

Except for bur oak and red oak our native oaks are very nearly all restricted in their distribution to the area south of the Platte river along the bluffs and ravines of the Missouri river and extending westward along the tributaries of the latter stream for a

scant twenty to forty miles. These represent the western-most extensions of species, all of which are much more abundant farther eastward or southward. White oak, black jack oak, laurel oak and pin oak are very rare within that area. Yellow oak, low yellow oak and swamp white oak are relatively abundant in a very few localities.

The ecological relations controlling these distributional phenomena are quite well known. The major ecological factors indicate a very decided advancement toward an increased xerophytism extending westward and northward from the southeastern corner of the state.

LINCOLN, NEBRASKA,
December, 1919.

SHORTER NOTES

THE PAPER MULBERRY (*Broussonetia*) AN "ARTILLERY PLANT."—A number of the Nettle Family (*Urticaceae*) are known to eject the pollen forcibly, one of these plants (*Pilea serpyllifolia* Wedd., or *P. muscosa* Lindl.) being often cultivated under the name "artillery plant" because of the curious explosive opening of the staminate flowers. Particularly when the plants are placed in sunlight, after having been sprinkled, the pollen is forcibly thrown out in a smoky cloud, reminding one of the bursting of miniature shells or bombs.

I was much interested last spring to find that the Paper Mulberry (*Broussonetia papyrifera* Vent.) has the same habit of throwing its pollen as has the *Pilea*. It is interesting to recall, also, that these plants are in closely related families, the *Moraceae* and *Urticaceae* having much in common. The 21st of May, 1919, in Philadelphia was a warm showery day, the frequent thunderstorms alternating with bright hot sunshine, and the paper mulberries, dripping after a shower, presented a curious spectacle in the bright sunlight. There was a continuous succession of puffs of smoky pollen from various parts of the tree, apparently all the flowers in a catkin exploding at once and filling the air with yellow "smoke" to a radius of about an inch in all directions, after which the pollen drifted lazily away on the gentle breeze.